

# MasterEmaco<sup>®</sup> S 211SP

Fiber-reinforced, silica-fume-enhanced structural wet- or dry-process shotcrete

FORMERLY SHOTPATCH<sup>®</sup> 21F

## PACKAGING

55 lb (25 kg) polyethylene-lined bags  
3,300 lb (1,500 kg) bulk bags

## YIELD

Approximately 0.46 ft<sup>3</sup> (0.013 m<sup>3</sup>), which will cover approximately 5.8 ft<sup>2</sup> (0.54 m<sup>2</sup>) at a 1" (25 mm) depth excluding rebound and waste.

## STORAGE

Store in unopened containers in a cool, clean, dry area

## SHELF LIFE

55 LB BAG: 1 year when properly stored  
3,300 LB BULK BAG: 3 months when properly stored

## VOC CONTENT

0 g/L less water and exempt solvents

## DESCRIPTION

MasterEmaco S 211SP is a one-component, fiber-reinforced repair mortar that contains an integral corrosion inhibitor. It can be applied by either the wet or dry shotcrete process.

## PRODUCT HIGHLIGHTS

- Fiber reinforced for plastic shrinkage control and reduced rebound
- Versatile, can be applied using dry or wet shotcrete process
- Very low chloride permeability and an integral corrosion inhibitor protects reinforcing steel
- Workable and easy to cut and finish when applied using wet process
- Prepackaged quality for bag-to-bag uniformity
- NSF/ANSI Std 61 certified for drinking water systems

## APPLICATIONS

- Interior and exterior
- Horizontal, vertical, and overhead surfaces
- Structural repair and retrofit of
  - Bridges, tunnels, and parking garages
  - Piers, docks, and dams
  - Reservoirs and tanks
  - Water management facilities
  - Canals and aqueducts

## SUBSTRATES

- Concrete

## HOW TO APPLY

### SURFACE PREPARATION

1. Substrate must be structurally sound and fully cured (28 days).
2. Saw cut the perimeter of the area being repaired into a square with a minimum depth of 1/4" (6 mm).
3. The surface to be repaired must be clean, free of laitance and saturated surface-dry (SSD) following ICRI Guideline no. 310.2 to permit proper bond.

### REINFORCING STEEL

1. Remove all oxidation and scale from the exposed reinforcing steel in accordance with ICRI Technical Guideline No. 310.1R.
2. For additional protection from future corrosion, coat the prepared reinforcing steel with MasterProtect P 8100 AP.

### MIXING

#### WET PROCESS

1. Add 0.68–0.77 gallons (2.57–2.91 L) of potable water per 55 lb (25 kg) bag of MasterEmaco S 211SP.
2. Mechanically mix using an appropriately sized forced-action mortar mixer. Pour approximately 90% of the water into the mixing container, then charge the mixer with the material. Add the remaining mix water as required.
3. Mix for 3–5 minutes to reach a homogeneous consistency.

**Technical Data**

**Composition**

MasterEmaco S 211 SP is a one-component silica-fume-enhanced fiber-reinforced mortar containing an integral corrosion inhibitor.

**Compliances**

- Cement meets ASTM C 150 standards
- Sand gradation meets ASTM C 33 and ACI 506 standards
- NSF/ANSI Std 61 certified for drinking water systems

**Typical Properties**

| PROPERTY   | VALUE       |
|--|-------------|
| <b>Unit weight,</b><br>lb/ft <sup>3</sup> (kg/m <sup>3</sup> ) | 129 (2,067) |
| <b>Set times, hrs:min</b><br>at 70° F (21° C) (ASTM C 266)     |             |
| Initial set  | 2:45        |
| Final set  | 6:00        |

**Test Data**

| PROPERTY   | RESULTS                    |                                   |                     | TEST METHOD                       |
|--|----------------------------|-----------------------------------|---------------------|-----------------------------------|
|  | 1 Day<br>Psi (MPa)         | 7 Day<br>Psi (MPa)                | 28 Day<br>Psi (MPa) |                                   |
| <b>Compressive strength</b>                                  | 2,500<br>(17.2)            | 6,000<br>(41.4)                   | 7,000<br>(48.3)     | ASTM C 109                        |
| <b>Splitting tensile strength</b>                            | 200<br>(1.4)               | 300<br>(2.1)                      | 400<br>(2.8)        | ASTM C 496                        |
| <b>Flexural strength</b>                                     | 700<br>(4.8)               | 1,200<br>(8.3)                    | 1,800<br>(12.4)     | ASTM C 348                        |
| <b>Direct tensile bond strength</b>                          | 50<br>(0.3)                | 130<br>(0.9)                      | 180<br>(1.2)        | ACI 503R, Appendix A              |
| <b>Slant shear bond strength</b>                             | 1,200<br>(8.3)             | 2,500<br>(17.2)                   | 3,000<br>(20.7)     | ASTM C 882, modified <sup>1</sup> |
| <b>Compressive strength</b>                                  |                            |                                   |                     | ASTM C 42                         |
|  | <b>3 day<br/>psi (MPa)</b> | <b>28 day<br/>psi (MPa)</b>       |                     |                                   |
| Dry process  | 6,000 (41.4)               | 10,000 (69.0)                     |                     |                                   |
| Wet process  | 5,500 (38.0)               | 9,500 (66.0)                      |                     |                                   |
| <b>Drying shrinkage, %, at 28 days</b>                       |                            | 0.08                              |                     | ASTM C 157, modified <sup>2</sup> |
| <b>Modulus of elasticity, psi (GPa),<br/>at 28 days</b>      |                            | 4.6 x 10 <sup>6</sup> (31.7)      |                     | ASTM C 469                        |
| <b>Rapid chloride permeability,<br/>coulombs, at 28 days</b> |                            | 685                               |                     | ASTM C 1202 /<br>AASHTO T-277     |
| <b>Freeze/thaw resistance, % RDM,<br/>at 300 cycles</b>      |                            | 95                                |                     | ASTM C 666,<br>Procedure A        |
| <b>Abrasion resistance</b>                                   |                            |                                   |                     | ASTM C 779A                       |
|  | <b>Duration,<br/>min</b>   | <b>Depth of wear,<br/>in (mm)</b> |                     |                                   |
|  | 30                         | 0.021 (0.53)                      |                     |                                   |
|  | 60                         | 0.036 (0.91)                      |                     |                                   |

<sup>1</sup>No epoxy bonding agent used.

<sup>2</sup>ICRI Guideline #03733, 1 by 1 by 10" (25 by 25 by 250 mm) prism, air cured.

Results were obtained when material was mixed with 0.8 gallons (3.0 L) of water per bag and cured at 70° F (21° C). Expect reasonable variations, depending upon application methods, test methods, and curing conditions.

